

## SEQUENCE LISTING

5 <110> Fader, Gary M  
 Famodu, Omolayo O.  
 Huang, Lisa  
 McGonigle, Brian  
 Silva, Alexandre da  
 Tao, Yong  
 10 <120> DIHYDROFLAVONOL-4-REDUCTASE  
 <130> BB-1521 US PRV  
 15 <140>  
 <141>  
 <160> 22  
 20 <170> Microsoft Word Version 7.0A  
 <210> 1  
 <211> 453  
 <212> DNA  
 25 <213> Glycine max  
 <400> 1  
 30 cttgtcttcc agcttgctac acctgtgaac tttgcttctg aagatcctga gaatgacatg, 60  
 atcaagcctg caatcacagg cgtcttgaat gtgttaaaag catgtgtgcg agcaaaagga 120  
 gtcaaacgag tcatcttgac atcttcagca gctgctgtga ccataaacca actcaaggga 180  
 actgatctgg ttatggatga aagcaactgg actgatgttg agtacttgag cactgcaaag 240  
 ccaccactt ggggttatcc tgcctcaaaa gcaactagcag agaaggcagc atggaaattt 300  
 gctgaagaaa atcacattga tctcatcact gtgataccta ctctcacaac tggtccttct 360  
 gtcaatacaa gacatcccaa caagtgttgg catggcaacg tccctcaaaa caggcaatga 420  
 35 ttctctcaaa aacgccctga aagggtatgc aaa 453  
 <210> 2  
 <211> 139  
 40 <212> PRT  
 <213> Glycine max  
 <400> 2  
 45 Leu Val Phe Gln Leu Ala Thr Pro Val Asn Phe Ala Ser Glu Asp Pro  
 1 5 10 15  
 Glu Asn Asp Met Ile Lys Pro Ala Ile Thr Gly Val Leu Asn Val Leu  
 20 25 30  
 50 Lys Ala Cys Val Arg Ala Lys Gly Val Lys Arg Val Ile Leu Thr Ser  
 35 40 45  
 Ser Ala Ala Ala Val Thr Ile Asn Gln Leu Lys Gly Thr Asp Leu Val  
 50 55 60  
 55 Met Asp Glu Ser Asn Trp Thr Asp Val Glu Tyr Leu Ser Thr Ala Lys  
 65 70 75 80  
 Pro Pro Thr Trp Gly Tyr Pro Ala Ser Lys Ala Leu Ala Glu Lys Ala

85 90 95

Ala Trp Lys Phe Ala Glu Glu Asn His Ile Asp Leu Ile Thr Val Ile  
100 105 110

5 Pro Thr Leu Thr Thr Gly Pro Ser Val Thr Thr Arg His Pro Asn Lys  
115 120 125

10 Cys Trp His Gly Asn Val Pro Gln Asn Arg Gln  
130 135

<210> 3  
<211> 1234  
15 <212> DNA  
<213> Glycine max

<400> 3

20 gcacgagatt ttatttttct ttctttcttt ggaagataaa gaatgggttc taagtccgaa 60  
accgttttgc ttactggggc ttctggttac atcggatcat ggcttgtcat gagactcatc 120  
gagcgtggct ataccgttcg agccaccgta ctcgaccag ctgatatgag ggaggtgaag 180  
catttgctgg atctgccagg tgcagagagc aagctgtctc tgtggaagc agaacttaca 240  
gaagagggaa gctttgatga agcattaaa ggtgacacag gtgttttcca cttggccacc 300  
cccggtgact ttaagtccaa agaccagag aatgaaatga taaagcctac aattcaagga 360  
25 gtactaaaca tcatgaaagc atgcctgaag gcaaaaactg tccgaaggct agtattcacg 420  
tcctcagccg gaactaccaa cattactgag caccaaaagc ctatcattga cgaaacctgc 480  
tggactgatg ttgagttctg ccggagatta aatatgactg gttggatgta ttctgtttct 540  
aaaacacttg cggagaaaga agcttgaaa ttgacgaaag agcacggcat ggacttcac 600  
gctatccttc cagctcttgt cattgtccc ttctactgc caacaatgcc ttctagcgtg 660  
30 atcagtgctc ttccacctat taacggaatt gaggcacatt attcaatcat aaagcaagct 720  
caattcgtcc acatagaaga tatctgtctt gctcacatat ttctgtttga acagccaaaa 780  
gcagaaggga ggtatatatg cagtgcattg gacgttacta tccatgacat tgtaaaatta 840  
attaacgaaa aataccaga gtacaagggt cccaccaagt ttcagaacat tccagatcaa 900  
ttggagcccg tgagatttcc ttccaagaaa atcacagact tgggattcca atttaaatat 960  
35 agcttagagg atatgtacac tggagcaatt gatacatgca tagagaaagg gcttcttct 1020  
aaacctgcag aaattccagc gaatggcatc gagcataaat aaatataggt ttccatatct 1080  
ttgctcggg gatgctatg aatgttgctt ttctgttcca gtttctttaa tgatgtttcc 1140  
gttttgtgaa ttctagtca aaattgtaag tggtttgtaa gaccaaatta gttatctaca 1200  
aatgttttaa tattatcaca aaaaaaaaaa aaaa 1234

40

<210> 4  
<211> 339  
<212> PRT  
45 <213> Glycine max

<400> 4

50 Met Gly Ser Lys Ser Glu Thr Val Cys Val Thr Gly Ala Ser Gly Tyr  
1 5 10 15

Ile Gly Ser Trp Leu Val Met Arg Leu Ile Glu Arg Gly Tyr Thr Val  
20 25 30

55 Arg Ala Thr Val Leu Asp Pro Ala Asp Met Arg Glu Val Lys His Leu  
35 40 45

Leu Asp Leu Pro Gly Ala Glu Ser Lys Leu Ser Leu Trp Lys Ala Glu  
50 55 60

60 Leu Thr Glu Glu Gly Ser Phe Asp Glu Ala Ile Lys Gly Cys Thr Gly

PCT/US2004/029541

3

5 gaccagaaa attatctcca tcatcttcat cgtgccggtc ctactcctc gctccaacaa 60  
 ccaatgccta caactacaag gctacaacaa agcatctata aaagataaag aatgggttct 120  
 aagtcgaaa ccgtttgcgt tactggggct tctgggtaca tcggatcatg gcttgtcatg 180  
 agactcatcg agcgtggcta taccgttcga gccaccgtac tcgaccagc tgatatgagg 240  
 gaggtgaagc atttgctgga tctgccaggt gcagagagca agctgtctct gtggaaggca 300  
 gaacttacag aagaggggaag ctttgatgaa gccattaaag ggtgcacagg tgtttccac 360  
 ttggccacc ccgttgactt taagtccaaa gaccagaga atgaaatgat aaagcctaca 420  
 attcaaggag tactaaacat catgaaagca tgctgaagg caaaaactgt ccgaaggcta 480  
 gtattcacgt cctcagccgg aactaccaac attactgagc accaaaagcc tatcattgac 540  
 10 gaaacctgct ggactgatgt tgagttctgc cggagattaa atatgactgg ttggatgtat 600  
 ttcgtttcta aaacacttgc ggagaaagaa gcttggaat ttgcgaaaga gcacggcatg 660  
 gacttcacg ctatccttcc agctcttctc attggtccct ttctactgcc aacaatacct 720  
 tctagcgtga tcagtgtctc ttcacctatt aacggaattg aggcacatta ttcaatcata 780  
 aagcaagctc aattcgtcca catagaagat atctgtcttg ctacacatatt tctgtttgaa 840  
 15 cagccaaaag cagaaggag gtatatatgc agtgcattg acgttactat ccatgacatt 900  
 gtaaaattaa ttaacgaaaa ataccagag tacaagggtc ccaccaagtt tcagaacatt 960  
 ccagatcaat tggagcccg gagattttct tccaagaaaa tcacagactt gggattccaa 1020  
 tttaaatata gcttagagga tatgtacact ggagcaattg atacatgcat agagaaagg 1080  
 cttcttcta aacctgcaga aattccagcg aatggcatcg agcataaata aatatagggt 1140  
 20 ttcatactt tgctcgggtg atggctatga atgttgctt tcttgctcag tttctttaat 1200  
 gatgtttccg tttgtgaat tcgtagtcaa aattgtaagt ggtttgtaag accaaattag 1260  
 ttatctacaa attgtttaat attatcaca gacattttt acggttaagtc aatatctcag 1320  
 agctcgaggc aatttaaat atatataata tgccgccatt gaattctcat taaaaaaaaa 1380  
 aaaaaaaaaa 1389

&lt;210&gt; 6

&lt;211&gt; 339

&lt;212&gt; PRT

30 &lt;213&gt; Glycine max

&lt;400&gt; 6

Met Gly Ser Lys Ser Glu Thr Val Cys Val Thr Gly Ala Ser Gly Tyr  
 1 5 10 15

35 Ile Gly Ser Trp Leu Val Met Arg Leu Ile Glu Arg Gly Tyr Thr Val  
 20 25 30

40 Arg Ala Thr Val Leu Asp Pro Ala Asp Met Arg Glu Val Lys His Leu  
 35 40 45

Leu Asp Leu Pro Gly Ala Glu Ser Lys Leu Ser Leu Trp Lys Ala Glu  
 50 55 60

45 Leu Thr Glu Glu Gly Ser Phe Asp Glu Ala Ile Lys Gly Cys Thr Gly  
 65 70 75 80

Val Phe His Leu Ala Thr Pro Val Asp Phe Lys Ser Lys Asp Pro Glu  
 85 90 95

50 Asn Glu Met Ile Lys Pro Thr Ile Gln Gly Val Leu Asn Ile Met Lys  
 100 105 110

55 Ala Cys Leu Lys Ala Lys Thr Val Arg Arg Leu Val Phe Thr Ser Ser  
 115 120 125

Ala Gly Thr Thr Asn Ile Thr Glu His Gln Lys Pro Ile Ile Asp Glu  
 130 135 140

60 Thr Cys Trp Thr Asp Val Glu Phe Cys Arg Arg Leu Asn Met Thr Gly

145                      150                      155                      160  
 Trp Met Tyr Phe Val Ser Lys Thr Leu Ala Glu Lys Glu Ala Trp Lys  
                                  165                      170                      175  
 5 Phe Ala Lys Glu His Gly Met Asp Phe Ile Ala Ile Leu Pro Ala Leu  
                                  180                      185                      190  
 10 Val Ile Gly Pro Phe Leu Leu Pro Thr Ile Pro Ser Ser Val Ile Ser  
                                  195                      200                      205  
 Ala Leu Ser Pro Ile Asn Gly Ile Glu Ala His Tyr Ser Ile Ile Lys  
                                  210                      215                      220  
 15 Gln Ala Gln Phe Val His Ile Glu Asp Ile Cys Leu Ala His Ile Phe  
                                  225                      230                      235                      240  
 Leu Phe Glu Gln Pro Lys Ala Glu Gly Arg Tyr Ile Cys Ser Ala Cys  
                                  245                      250                      255  
 20 Asp Val Thr Ile His Asp Ile Val Lys Leu Ile Asn Glu Lys Tyr Pro  
                                  260                      265                      270  
 25 Glu Tyr Lys Val Pro Thr Lys Phe Gln Asn Ile Pro Asp Gln Leu Glu  
                                  275                      280                      285  
 Pro Val Arg Phe Ser Ser Lys Lys Ile Thr Asp Leu Gly Phe Gln Phe  
                                  290                      295                      300  
 30 Lys Tyr Ser Leu Glu Asp Met Tyr Thr Gly Ala Ile Asp Thr Cys Ile  
                                  305                      310                      315                      320  
 Glu Lys Gly Leu Leu Pro Lys Pro Ala Glu Ile Pro Ala Asn Gly Ile  
                                  325                      330                      335  
 35 Glu His Lys  
  
 40 <210> 7  
     <211> 952  
     <212> DNA  
     <213> Glycine max  
  
 45 <400> 7  
 cttgtcttcc agcttgctac acctgtgaac tttgcttctg aagatcctga gaatgacatg 60  
 atcaagcctg caatcacagg cgtcttgaat gtgttaaaag catgtgtgcg agcaaaagga 120  
 gtcaaacgag tcatcttgac atcttcagca gctgctgtga ccataaaacca actcaaggga 180  
 actgatctgg ttatggatga aagcaactgg actgatgttg agtacttgag cactgcaaa- 240  
 50 ccaccactt ggggttatcc tgcctccaaa gcactagcag agaaggcagc atggaaattt 300  
 gctgaagaaa atcacattga tctcatcact gtgataccta ctctcacaac tggtccttct 360  
 gtactacag acatcccatc aagtgttggc atggcagcgt ccctcataac aggcaatgat 420  
 ttctctcataa acgctctgaa aggtatgcag ttgctatcag gttcaatcct catcactcat 480  
 gtggaggata ttgcccagc acaaatattt gtggcggaga aagaatcggc ttctgggtcg 540  
 55 tacatttgct gtgctcacia tactagtgtt cctgagcttg caaagtttct cagcaaacga 600  
 taccctcaat ataaaattcc aactgaattc gatgattgtc cctcaaaggc aaagttaata 660  
 atctcttccg aaaagcttgt caaagaagga ttcagtttca agtatggaat tgaagaaatt 720  
 tatgatcaga ctctggagta cttaaagagc aaaggggctc tgaataactg aattttgaaa 780  
 attctaagtc tctagcaaac tctccacttg ttatgtagta gcatcttgcg aataattaat 840  
 60 caaggggaat agcaaccatc tctgttaaat cactacttta ttaccacctc cttaaattac 900

tgattatgat attccccact ttgttaaaaa aaaaaaaaaa aaaaaaaaaa aa 952

<210> 8

5 <211> 256

<212> PRT

<213> Glycine max

<400> 8

10 Leu Val Phe Gln Leu Ala Thr Pro Val Asn Phe Ala Ser Glu Asp Pro  
1 5 10 15

Glu Asn Asp Met Ile Lys Pro Ala Ile Thr Gly Val Leu Asn Val Leu  
20 25 30

15 Lys Ala Cys Val Arg Ala Lys Gly Val Lys Arg Val Ile Leu Thr Ser  
35 40 45

20 Ser Ala Ala Ala Val Thr Ile Asn Gln Leu Lys Gly Thr Asp Leu Val  
50 55 60

Met Asp Glu Ser Asn Trp Thr Asp Val Glu Tyr Leu Ser Thr Ala Lys  
65 70 75 80

25 Pro Pro Thr Trp Gly Tyr Pro Ala Ser Lys Ala Leu Ala Glu Lys Ala  
85 90 95

Ala Trp Lys Phe Ala Glu Glu Asn His Ile Asp Leu Ile Thr Val Ile  
100 105 110

30 Pro Thr Leu Thr Thr Gly Pro Ser Val Thr Thr Asp Ile Pro Ser Ser  
115 120 125

35 Val Gly Met Ala Ala Ser Leu Ile Thr Gly Asn Asp Phe Leu Ile Asn  
130 135 140

Ala Leu Lys Gly Met Gln Leu Leu Ser Gly Ser Ile Ser Ile Thr His  
145 150 155 160

40 Val Glu Asp Ile Cys Arg Ala Gln Ile Phe Val Ala Glu Lys Glu Ser  
165 170 175

Ala Ser Gly Arg Tyr Ile Cys Cys Ala His Asn Thr Ser Val Pro Glu  
180 185 190

45 Leu Ala Lys Phe Leu Ser Lys Arg Tyr Pro Gln Tyr Lys Ile Pro Thr  
195 200 205

50 Glu Phe Asp Asp Cys Pro Ser Lys Ala Lys Leu Ile Ile Ser Ser Glu  
210 215 220

Lys Leu Val Lys Glu Gly Phe Ser Phe Lys Tyr Gly Ile Glu Glu Ile  
225 230 235 240

55 Tyr Asp Gln Thr Leu Glu Tyr Leu Lys Ser Lys Gly Ala Leu Asn Asn  
245 250 255

<210> 9

60 <211> 546

<212> DNA  
<213> Triticum aestivum

<220>  
5 <221> unsure  
<222> (534)..(535)..(536)..(537)..(538)  
<223> n = a, c, g or t

<220>  
10 <221> unsure  
<222> (542)..(543)..(544)  
<223> n = a, c, g or t

<400> 9  
15 gcacgaggca gagaatggcg aataacttcca agggcaaggt gtgtgtcact ggagcctctg 60  
gctttgttgc ctcttggtt gtcaagcgac ttctcgagtc aggttatcat gttctaggga 120  
cagtcagaga cccaggcaat cagaagaagg tagcacacct ctggaactta gcaggtgcta 180  
aggaggggct ggagcttgtc agggctgacc tcttggaaga agggagcttc gacgatgccg 240  
tgatggcctg tgagggcgctc ttccacaccg catcgccctat catcactaac gctgattcca 300  
20 aggaagaaat gcttgattcg gcgataaacg gcactctaaa cgtgctgaga tcctgcaaga 360  
agaatccatt cctcaaaagg gttgtcctca cgtcttcgctc gtcgaccatg aggctgagag 420  
atgaagctga attccctccc aacgtgctgc tggatgaaac atcatggagc tccgtggagt 480  
tctgcgaaag catccagata tggtagcgtg ttgcgaagat cctcgctgag aaannnnncc 540  
tnnnag 546

<210> 10  
<211> 177  
<212> PRT

30 <213> Triticum aestivum

<220>  
<221> UNSURE  
<222> (174)..(175)  
35 <223> Xaa = ANY AMINO ACID

<220>  
<221> UNSURE  
<222> (177)  
40 <223> Xaa = ANY AMINO ACID

<400> 10  
Met Ala Asn Thr Ser Lys Gly Lys Val Cys Val Thr Gly Ala Ser Gly  
1 5 10 15  
45 Phe Val Ala Ser Trp Leu Val Lys Arg Leu Leu Glu Ser Gly Tyr His  
20 25 30  
50 Val Leu Gly Thr Val Arg Asp Pro Gly Asn Gln Lys Lys Val Ala His  
35 40 45  
Leu Trp Asn Leu Ala Gly Ala Lys Glu Gly Leu Glu Leu Val Arg Ala  
50 55 60  
55 Asp Leu Leu Glu Glu Gly Ser Phe Asp Asp Ala Val Met Ala Cys Glu  
65 70 75 80  
Gly Val Phe His Thr Ala Ser Pro Ile Ile Thr Asn Ala Asp Ser Lys  
85 90 95  
60

Glu Glu Met Leu Asp Ser Ala Ile Asn Gly Thr Leu Asn Val Leu Arg  
 100 105 110  
 5 Ser Cys Lys Lys Asn Pro Phe Leu Lys Arg Val Val Leu Thr Ser Ser  
 115 120 125  
 Ser Ser Thr Met Arg Leu Arg Asp Glu Ala Glu Phe Pro Pro Asn Val  
 130 135 140  
 10 Leu Leu Asp Glu Thr Ser Trp Ser Ser Val Glu Phe Cys Glu Ser Ile  
 145 150 155 160  
 Gln Ile Trp Tyr Ala Val Ala Lys Ile Leu Ala Glu Lys Xaa Xaa Leu  
 165 170 175  
 15 Xaa  
 20 <210> 11  
 <211> 1291  
 <212> DNA  
 <213> Triticum aestivum  
 25 <400> 11  
 gaaagctcaa gaaggaagtc gatagagaga tgaagggaga gacaatggac gggaacaaag 60  
 gaccggtggt ggtgaccgga gcgtcgggtt tcgtaggatc atggctcgtc atgaagctcc 120  
 tccaggtcgg gtacaccgct cgggccaccg tgcgcgaccc ggccaacgtt gagaagaaca 180  
 agccattgct ggagcttccc ggagccaagg agcggctgtc catctggaag gccgacctga 240  
 30 gcgaggaagg cagcttcgac gacgccatcg ccggctgcac cggcgtcttc cacgtcgcca 300  
 cgcccatgga cttcgactcc caagaccccg aaaacgaggt gatcaagccg acggtggaag 360  
 ggatgctgag catcatgagg gcctgcaagg aggctggcac cgtgaaacgc atagtcttca 420  
 cctcctccgc cggcagcgtc aacatcgagg agcggcagcg gccagcctac gaccaggaca 480  
 actggagcga catcgacttc tgccgccgcg tcaagatgac aggatggatg tacttcgtgt 540  
 35 ccaagtccct ggagagaagg gccgccatgg agtacgcag cgagaacgpc ctggacttca 600  
 tcagcatcat cccacgctc gtctcggcc cgttcctcag cgccggcatg ccgccagcc 660  
 tcgtcaccgc cctcgcgctc atcacgggga acgaggccca ctactcgatc ctgaagcagg 720  
 tgcagctggt ccacctggat gacctctgcy acgccatgac ctctccttcc gagcaccgcy 780  
 aggccaacgg ccgtacatc tgctcctccc acgacgccac catccacgpc ctgcaccgga 840  
 40 tgctcggga caggttcccc gactacagca tcccacagaa gttcgcaggt gtcgacgacg 900  
 acctccagcc catccacttc tcctccaaga agctcctcga ccacggcttc agcttccggt 960  
 acaccgccga ggacatgttc gacgccgcca tccgcacctg caggagagaag gccctcattc 1020  
 cgctcggaga cggcccgccg cctgcagccg gcggcaagct gggagctctt gctgcggggg 1080  
 aaggccaagc cattgtgtga gaaacataat aagccagcgc tgctgcgtga atactattct 1140  
 45 tgtgttcgca atttgcatgg gcagagccct gtaactagt ggatatcatg gactatggag 1200  
 tgcacatatt tttttccacc tcggtagtag tatgaaataa aattgaaaat aacgcataaa 1260  
 ctttatcagt attaaaaaaa aaaaaaaaaa a 1291  
 50 <210> 12  
 <211> 354  
 <212> PRT  
 <213> Triticum aestivum  
 55 <400> 12  
 Met Asp Gly Asn Lys Gly Pro Val Val Val Thr Gly Ala Ser Gly Phe  
 1 5 10 15  
 60 Val Gly Ser Trp Leu Val Met Lys Leu Leu Gln Val Gly Tyr Thr Val  
 20 25 30



Arg Ala Thr Val Arg Asp Pro Ala Asn Val Glu Lys Asn Lys Pro Leu  
 35 40 45  
 5 Leu Glu Leu Pro Gly Ala Lys Glu Arg Leu Ser Ile Trp Lys Ala Asp  
 50 55 60  
 Leu Ser Glu Glu Gly Ser Phe Asp Asp Ala Ile Ala Gly Cys Thr Gly  
 65 70 75 80  
 10 Val Phe His Val Ala Thr Pro Met Asp Phe Asp Ser Gln Asp Pro Glu  
 85 90 95  
 15 Asn Glu Val Ile Lys Pro Thr Val Glu Gly Met Leu Ser Ile Met Arg  
 100 105 110  
 Ala Cys Lys Glu Ala Gly Thr Val Lys Arg Ile Val Phe Thr Ser Ser  
 115 120 125  
 20 Ala Gly Ser Val Asn Ile Glu Glu Arg Gln Arg Pro Ala Tyr Asp Gln  
 130 135 140  
 Asp Asn Trp Ser Asp Ile Asp Phe Cys Arg Arg Val Lys Met Thr Gly  
 145 150 155 160  
 25 Trp Met Tyr Phe Val Ser Lys Ser Leu Ala Glu Lys Ala Ala Met Glu  
 165 170 175  
 30 Tyr Ala Ser Glu Asn Gly Leu Asp Phe Ile Ser Ile Ile Pro Thr Leu  
 180 185 190  
 Val Val Gly Pro Phe Leu Ser Ala Gly Met Pro Pro Ser Leu Val Thr  
 195 200 205  
 35 Ala Leu Ala Leu Ile Thr Gly Asn Glu Ala His Tyr Ser Ile Leu Lys  
 210 215 220  
 Gln Val Gln Leu Val His Leu Asp Asp Leu Cys Asp Ala Met Thr Phe  
 225 230 235 240  
 40 Leu Phe Glu His Pro Glu Ala Asn Gly Arg Tyr Ile Cys Ser Ser His  
 245 250 255  
 45 Asp Ala Thr Ile His Gly Leu Ala Arg Met Leu Arg Asp Arg Phe Pro  
 260 265 270  
 Glu Tyr Ser Ile Pro Gln Lys Phe Ala Gly Val Asp Asp Asp Leu Gln  
 275 280 285  
 50 Pro Ile His Phe Ser Ser Lys Lys Leu Leu Asp His Gly Phe Ser Phe  
 290 295 300  
 Arg Tyr Thr Ala Glu Asp Met Phe Asp Ala Ala Ile Arg Thr Cys Arg  
 305 310 315 320  
 55 Glu Lys Gly Leu Ile Pro Leu Gly Asp Ala Pro Pro Pro Ala Ala Gly  
 325 330 335  
 60 Gly Lys Leu Gly Ala Leu Ala Ala Gly Glu Gly Gln Ala Ile Gly Ala  
 340 345 350

Glu Thr

5

&lt;210&gt; 13

&lt;211&gt; 1222

&lt;212&gt; DNA

&lt;213&gt; Triticum aestivum

10

&lt;400&gt; 13

```

gcacgaggca gagaatggcg aatacttcca agggcaaggt gtgtgtcact ggagcctctg 60
gctttgttgc ctcttggtt gtcaagcgac ttctcgagtc aggttatcat gttctaggga 120
cagtcagaga cccaggcaat cagaagaagg tagcacacct ctggaactta gcagggtgcta 180
aggaggggct ggagcttgct agggctgacc tcttggaaga agggagcttc gacgatgccg 240
tgatggcctg tgagggcgct tccacaccg catcgccctat catcactaac gctgattcca 300
aggaagaaat gcttgattcg gcgataaacg gcactctaaa cgtgctgaga tccgtcaaga 360
agaatccatt cctcaaaagg gttgtcctca cgtcttcgtc gtcgaccatg aggctgagag 420
atgaagctga attccctccc aacgtgctgc tggatgaaac atcatggagc tccgtggagt 480
tctgcgaaaag catccagata tggtagctg ttgcgaagat cctcgctgag aaatcagcct 540
gggagttcgc caaggagaac aacatcgacc tcgtggcgtt tcttccgacg ttcattcatc 600
gccctaacct ctcccctgtg ttaggcccca ccgcctcaga tgccttggc ttgtttaaag 660
gggagacgga gaagttcacc atcttcggga ggatggggtg cgtccacatc gacgacgtcg 720
cgagctgcca catcctggtc tacgaaaccg ccgacgcca ggggaggtac atctgcaact 780
cggcggttct ggatagcaac gagctggctg ccttgctcgc gaaacgggtc ccgtcgttcc 840
ccatcccga gaggttaccg aacatttacg gggagcagac gtacggctac aacacgtcaa 900
agatccgga gctggggctt gaggttcagag gcgtggagga gatgttcgac gactcgttgg 960
agtcgctcaa ggcgcatggc tatctgcgcg agggcgccgc gtgatgcgga tgagcggaca 1020
ggatcgatcc gccggaggga agaatacagag gccgtggtgc ctgctctaga agcatttcag 1080
ttattactaa cacatgagaa gaatgcgttc cctttcttgt ctttatttct gctttgggtg 1140
ttcccttgcc actctgcaga cagtcatgaa cgacaaggaa atgaaatgta ctccatgttg 1200
cattaaaaaa aaaaaaaaaa aa 1222

```

35

&lt;210&gt; 14

&lt;211&gt; 329

&lt;212&gt; PRT

&lt;213&gt; Triticum aestivum

40

&lt;400&gt; 14

```

Met Ala Asn Thr Ser Lys Gly Lys Val Cys Val Thr Gly Ala Ser Gly
  1             5             10             15

```

45

```

Phe Val Ala Ser Trp Leu Val Lys Arg Leu Leu Glu Ser Gly Tyr His
      20             25             30

```

```

Val Leu Gly Thr Val Arg Asp Pro Gly Asn Gln Lys Lys Val Ala His
      35             40             45

```

50

```

Leu Trp Asn Leu Ala Gly Ala Lys Glu Gly Leu Glu Leu Val Arg Ala
      50             55             60

```

```

Asp Leu Leu Glu Glu Gly Ser Phe Asp Asp Ala Val Met Ala Cys Glu
      65             70             75             80

```

55

```

Gly Val Phe His Thr Ala Ser Pro Ile Ile Thr Asn Ala Asp Ser Lys
      85             90             95

```

60

```

Glu Glu Met Leu Asp Ser Ala Ile Asn Gly Thr Leu Asn Val Leu Arg
      100            105            110

```

Ser Cys Lys Lys Asn Pro Phe Leu Lys Arg Val Val Leu Thr Ser Ser  
 115 120 125

5 Ser Ser Thr Met Arg Leu Arg Asp Glu Ala Glu Phe Pro Pro Asn Val  
 130 135 140

Leu Leu Asp Glu Thr Ser Trp Ser Ser Val Glu Phe Cys Glu Ser Ile  
 145 150 155 160

10 Gln Ile Trp Tyr Ala Val Ala Lys Ile Leu Ala Glu Lys Ser Ala Trp  
 165 170 175

15 Glu Phe Ala Lys Glu Asn Asn Ile Asp Leu Val Ala Val Leu Pro Thr  
 180 185 190

Phe Ile Ile Gly Pro Asn Leu Ser Pro Val Leu Gly Pro Thr Ala Ser  
 195 200 205

20 Asp Val Leu Gly Leu Phe Lys Gly Glu Thr Glu Lys Phe Thr Ile Phe  
 210 215 220

Gly Arg Met Gly Tyr Val His Ile Asp Asp Val Ala Ser Cys His Ile  
 225 230 235 240

25 Leu Val Tyr Glu Thr Ala Asp Ala Lys Gly Arg Tyr Ile Cys Asn Ser  
 245 250 255

30 Ala Val Leu Asp Ser Asn Glu Leu Val Ala Leu Leu Ala Lys Arg Phe  
 260 265 270

Pro Ser Phe Pro Ile Pro Lys Ser Leu Pro Asn Ile Tyr Gly Glu Gln  
 275 280 285

35 Thr Tyr Gly Tyr Asn Thr Ser Lys Ile Arg Lys Leu Gly Leu Glu Phe  
 290 295 300

Arg Gly Val Glu Glu Met Phe Asp Asp Ser Val Glu Ser Leu Lys Ala  
 305 310 315 320

40 His Gly Tyr Leu Arg Glu Gly Ala Ala  
 325

45 <210> 15  
 <211> 1350  
 <212> DNA  
 <213> Triticum aestivum

50 <400> 15  
 gcacgagagc cattgaaaga aagctcaaga aggaagtcga tagagagatg aagggagaga 60  
 caatggacgg gagcaaaggg cgggtggtgg tgactggagc gtcgggtttc gtagggtcgt 120  
 ggctcgtcat gaagctcctc caggccgggt acaccgtccg ggccaccgtg cgcgaccgg 180  
 ccaacgttga gaagaacaag ccgttgctgg agcttcccg agccaaggag cggctgtcca 240  
 55 tctggaaggc cgacctgagc gacgaaggca gcttcgacga cgccatcgcc ggctgcaccg 300  
 gcgtcttcca cgtcgccacg cccatggact tcgactccaa agatcccag aacgaggtga 360  
 tcaaaccac ggtggaaggg atgctgagca tcatgagggc ctgcaaggag gctggcaccg 420  
 tgaagcgcat cgtcttcacc tcctccgccg gcagcgtcaa catcgaggag cggcagcggc 480  
 cagcctacga ccaggacaac tggagcgaca tcgacttctg ccgcgcgctc aagatgacag 540  
 60 gatggatgta ctctgtgtcc aagtcctcgc cagagaaggc cgccatggag tacgccagcg 600

agaacggcct ggacttcac agcatcatcc ccacgctcgt agtcggcccg ttcctcagcg 660  
 ccggcatgcc gccagcctc gtcaccgccc tggcgctcat cacagggaaat gaagcccact 720  
 actcgatcct gaagcagggtg cagctggtgc acctggacga cctctgacac gccatgacct 780  
 5 tctcttctga gcaccggag gccaacggcc gctacatctg ctctccacac gacgccacca 840  
 tccacggcct cgccaggatg ctccgggaca gggtcccgga gtacagcatc cgcacaagt 900  
 tcgcaggcgt cgacgacgac ctccagccca tccacttctc ctccaagaag ctctcgacc 960  
 acggcttcag cttccggtac accgcccagg acatgtttga cgctgccatc cgcacctgca 1020  
 gggagaagg cctcattccg ctccgagacg ccccgggcgc tgcatgtgcc ggcaagctgg 1080  
 gagctcttgc tgcgggcaaa ggccaagcca ttggtgccga gacataataa gccagcgctg 1140  
 10 ctgcatgaat actattcttg tgctcggaat ttgcatgggc agagccctgt aactagtggg 1200  
 atatcatgga ctatggagtg catcaaattt ttttcacctc gccagtagta tgaaataaaa 1260  
 ttgaaataaa cgcataaact ttatcagtat taaaaaaaaa aaaaaaaaaa aaaaaaaaaa 1320  
 aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 1350

<210> 16

<211> 354

<212> PRT

<213> Triticum aestivum

<400> 16

Met Asp Gly Ser Lys Gly Pro Val Val Val Thr Gly Ala Ser Gly Phe  
 1 5 10 15

Val Gly Ser Trp Leu Val Met Lys Leu Leu Gln Ala Gly Tyr Thr Val  
 20 25 30

Arg Ala Thr Val Arg Asp Pro Ala Asn Val Glu Lys Asn Lys Pro Leu  
 35 40 45

Leu Glu Leu Pro Gly Ala Lys Glu Arg Leu Ser Ile Trp Lys Ala Asp  
 50 55 60

Leu Ser Asp Glu Gly Ser Phe Asp Asp Ala Ile Ala Gly Cys Thr Gly  
 65 70 75 80

Val Phe His Val Ala Thr Pro Met Asp Phe Asp Ser Lys Asp Pro Glu  
 85 90 95

Asn Glu Val Ile Lys Pro Thr Val Glu Gly Met Leu Ser Ile Met Arg  
 100 105 110

Ala Cys Lys Glu Ala Gly Thr Val Lys Arg Ile Val Phe Thr Ser Ser  
 115 120 125

Ala Gly Ser Val Asn Ile Glu Glu Arg Gln Arg Pro Ala Tyr Asp Gln  
 130 135 140

Asp Asn Trp Ser Asp Ile Asp Phe Cys Arg Arg Val Lys Met Thr Gly  
 145 150 155 160

Trp Met Tyr Phe Val Ser Lys Ser Leu Ala Glu Lys Ala Ala Met Glu  
 165 170 175

Tyr Ala Ser Glu Asn Gly Leu Asp Phe Ile Ser Ile Ile Pro Thr Leu  
 180 185 190

Val Val Gly Pro Phe Leu Ser Ala Gly Met Pro Pro Ser Leu Val Thr  
 195 200 205

Ala Leu Ala Leu Ile Thr Gly Asn Glu Ala His Tyr Ser Ile Leu Lys  
 210 215 220  
 5 Gln Val Gln Leu Val His Leu Asp Asp Leu Cys Asp Ala Met Thr Phe  
 225 230 235 240  
 Leu Phe Glu His Pro Glu Ala Asn Gly Arg Tyr Ile Cys Ser Ser His  
 245 250 255  
 10 Asp Ala Thr Ile His Gly Leu Ala Arg Met Leu Arg Asp Arg Phe Pro  
 260 265 270  
 Glu Tyr Ser Ile Pro His Lys Phe Ala Gly Val Asp Asp Asp Leu Gln  
 275 280 285  
 15 Pro Ile His Phe Ser Ser Lys Lys Leu Leu Asp His Gly Phe Ser Phe  
 290 295 300  
 20 Arg Tyr Thr Ala Glu Asp Met Phe Asp Ala Ala Ile Arg Thr Cys Arg  
 305 310 315 320  
 Glu Lys Gly Leu Ile Pro Leu Gly Asp Ala Pro Ala Pro Ala Ala Ala  
 325 330 335  
 25 Gly Lys Leu Gly Ala Leu Ala Ala Gly Lys Gly Gln Ala Ile Gly Ala  
 340 345 350  
 Glu Thr  
 30  
 <210> 17  
 <211> 347  
 <212> PRT  
 35 <213> Glycine max  
 <400> 17  
 Met Gly Ser Ala Ser Glu Ser Val Cys Val Thr Gly Ala Ser Gly Phe  
 1 5 10 15  
 40 Ile Gly Ser Trp Leu Val Met Arg Leu Ile Glu Arg Gly Tyr Thr Val  
 20 25 30  
 45 Arg Ala Thr Val Arg Asp Pro Val Asn Met Lys Lys Val Lys His Leu  
 35 40 45  
 Val Glu Leu Pro Gly Ala Lys Ser Lys Leu Ser Leu Trp Lys Ala Asp  
 50 55 60  
 50 Leu Ala Glu Glu Gly Ser Phe Asp Glu Ala Ile Lys Gly Cys Thr Gly  
 65 70 75 80  
 Val Phe His Val Ala Thr Pro Met Asp Phe Glu Ser Lys Asp Pro Glu  
 85 90 95  
 55 Asn Glu Val Ile Lys Pro Thr Ile Asn Gly Val Leu Asp Ile Met Lys  
 100 105 110  
 60 Ala Cys Leu Lys Ala Lys Thr Val Arg Arg Leu Ile Phe Thr Ser Ser  
 115 120 125

Ala Gly Thr Leu Asn Val Ile Glu Arg Gln Lys Pro Val Phe Asp Asp  
 130 135 140  
 5 Thr Cys Trp Ser Asp Val Glu Phe Cys Arg Arg Val Lys Met Thr Gly  
 145 150 155 160  
 Trp Met Tyr Phe Val Ser Lys Thr Leu Ala Glu Lys Glu Ala Trp Lys  
 165 170 175  
 10 Phe Ala Lys Glu Gln Gly Leu Asp Phe Ile Thr Ile Ile Pro Pro Leu  
 180 185 190  
 Val Val Gly Pro Phe Leu Met Pro Thr Met Pro Pro Ser Leu Ile Thr  
 195 200 205  
 15 Ala Leu Ser Pro Ile Thr Gly Asn Glu Asp His Tyr Ser Ile Ile Lys  
 210 215 220  
 20 Gln Gly Gln Phe Val His Leu Asp Asp Leu Cys Leu Ala His Ile Phe  
 225 230 235 240  
 Leu Phe Glu Glu Pro Glu Val Glu Gly Arg Tyr Ile Cys Ser Ala Cys  
 245 250 255  
 25 Asp Ala Thr Ile His Asp Ile Ala Lys Leu Ile Asn Gln Lys Tyr Pro  
 260 265 270  
 Glu Tyr Lys Val Pro Thr Lys Phe Lys Asn Ile Pro Asp Gln Leu Glu  
 275 280 285  
 30 Leu Val Arg Phe Ser Ser Lys Lys Ile Thr Asp Leu Gly Phe Lys Phe  
 290 295 300  
 35 Lys Tyr Ser Leu Glu Asp Met Tyr Thr Gly Ala Ile Asp Thr Cys Arg  
 305 310 315 320  
 Asp Lys Gly Leu Leu Pro Lys Pro Ala Glu Lys Gly Leu Phe Thr Lys  
 325 330 335  
 40 Pro Gly Glu Thr Pro Val Asn Ala Met His Lys  
 340 345  
 45 <210> 18  
 <211> 342  
 <212> PRT  
 <213> Arabidopsis thaliana  
 50 <400> 18  
 Met Asp Gln Thr Leu Thr His Thr Gly Ser Lys Lys Ala Cys Val Ile  
 1 5 10 15  
 Gly Gly Thr Gly Asn Leu Ala Ser Ile Leu Ile Lys His Leu Leu Gln  
 20 25 30  
 55 Ser Gly Tyr Lys Val Asn Thr Thr Val Arg Asp Pro Glu Asn Glu Lys  
 35 40 45  
 60 Lys Ile Ala His Leu Arg Gln Leu Gln Glu Leu Gly Asp Leu Lys Ile

50                      55                      60  
 Phe Lys Ala Asp Leu Thr Asp Glu Asp Ser Phe Glu Ser Ser Phe Ser  
 65                      70                      75                      80  
 5 Gly Cys Glu Tyr Ile Phe His Val Ala Thr Pro Ile Asn Phe Lys Ser  
                                  85                      90                      95  
 10 Glu Asp Pro Glu Lys Asp Met Ile Lys Pro Ala Ile Gln Gly Val Ile  
                                  100                      105                      110  
 Asn Val Leu Lys Ser Cys Leu Lys Ser Lys Ser Val Lys Arg Val Ile  
                                  115                      120                      125  
 15 Tyr Thr Ser Ser Ala Ala Ala Val Ser Ile Asn Asn Leu Ser Gly Thr  
                                  130                      135                      140  
 Gly Leu Val Met Asn Glu Glu Asn Trp Thr Asp Ile Asp Phe Leu Thr  
 20 145                      150                      155                      160  
 Glu Glu Lys Pro Phe Asn Trp Gly Tyr Pro Ile Ser Lys Val Leu Ala  
                                  165                      170                      175  
 25 Glu Lys Lys Ala Trp Glu Phe Ala Glu Glu Asn Lys Ile Asn Leu Val  
                                  180                      185                      190  
 Thr Val Ile Pro Ala Leu Ile Ala Gly Asn Ser Leu Leu Ser Asp Pro  
                                  195                      200                      205  
 30 Pro Ser Ser Leu Ser Leu Ser Met Ser Phe Ile Thr Gly Lys Glu Met  
                                  210                      215                      220  
 His Val Thr Gly Leu Lys Glu Met Gln Lys Leu Ser Gly Ser Ile Ser  
 35 225                      230                      235                      240  
 Phe Val His Val Asp Asp Leu Ala Arg Ala His Leu Phe Leu Ala Glu  
                                  245                      250                      255  
 40 Lys Glu Thr Ala Ser Gly Arg Tyr Ile Cys Cys Ala Tyr Asn Thr Ser  
                                  260                      265                      270  
 Val Pro Glu Ile Ala Asp Phe Leu Ile Gln Arg Tyr Pro Lys Tyr Asn  
                                  275                      280                      285  
 45 Val Leu Ser Glu Phe Glu Glu Gly Leu Ser Ile Pro Lys Leu Thr Leu  
                                  290                      295                      300  
 Ser Ser Gln Lys Leu Ile Asn Glu Gly Phe Arg Phe Glu Tyr Gly Ile  
 50 305                      310                      315                      320  
 Asn Glu Met Tyr Asp Gln Met Ile Glu Tyr Phe Glu Ser Lys Gly Leu  
                                  325                      330                      335  
 55 Ile Lys Ala Lys Glu Ser  
                                  340

&lt;210&gt; 19

&lt;211&gt; 354

60 &lt;212&gt; PRT

&lt;213&gt; Hordeum vulgare

&lt;400&gt; 19

5 Met Asp Gly Asn Lys Gly Pro Val Val Val Thr Gly Ala Ser Gly Phe  
 1 5 10 15  
 Val Gly Ser Trp Leu Val Met Lys Leu Leu Gln Ala Gly Tyr Thr Val  
 20 25 30  
 10 Arg Ala Thr Val Arg Asp Pro Ala Asn Val Glu Lys Thr Lys Pro Leu  
 35 40 45  
 Leu Glu Leu Pro Gly Ala Lys Glu Arg Leu Ser Ile Trp Lys Ala Asp  
 50 55 60  
 15 Leu Ser Glu Asp Gly Ser Phe Asn Glu Ala Ile Ala Gly Cys Thr Gly  
 65 70 75 80  
 20 Val Phe His Val Ala Thr Pro Met Asp Phe Asp Ser Gln Asp Pro Glu  
 85 90 95  
 Asn Glu Val Ile Lys Pro Thr Val Glu Gly Met Leu Ser Ile Met Arg  
 100 105 110  
 25 Ala Cys Lys Glu Ala Gly Thr Val Lys Arg Ile Val Phe Thr Ser Ser  
 115 120 125  
 Ala Gly Ser Val Asn Ile Glu Glu Arg Pro Arg Pro Ala Tyr Asp Gln  
 130 135 140  
 30 Asp Asn Trp Ser Asp Ile Asp Tyr Cys Arg Arg Val Lys Met Thr Gly  
 145 150 155 160  
 35 Trp Met Tyr Phe Val Ser Lys Ala Leu Ala Glu Lys Ala Ala Met Glu  
 165 170 175  
 Tyr Ala Ser Glu Asn Gly Leu Asp Phe Ile Ser Ile Ile Pro Thr Leu  
 180 185 190  
 40 Val Val Gly Pro Phe Leu Ser Ala Gly Met Pro Pro Ser Leu Val Thr  
 195 200 205  
 Ala Leu Ala Leu Ile Thr Gly Asn Glu Ala His Tyr Ser Ile Leu Lys  
 210 215 220  
 45 Gln Val Gln Leu Val His Leu Asp Asp Leu Cys Asp Ala Met Thr Phe  
 225 230 235 240  
 50 Leu Phe Glu His Pro Glu Ala Asn Gly Arg Tyr Ile Cys Ser Ser His  
 245 250 255  
 Asp Ala Thr Ile His Gly Leu Ala Arg Met Leu Gln Asp Arg Phe Pro  
 260 265 270  
 55 Glu Tyr Asp Ile Pro Gln Lys Phe Ala Gly Val Asp Asp Asn Leu Gln  
 275 280 285  
 Pro Ile His Phe Ser Ser Lys Lys Leu Leu Asp His Gly Phe Ser Phe  
 290 295 300  
 60



Arg Tyr Thr Thr Glu Asp Met Phe Asp Ala Ala Ile His Thr Cys Arg  
 305 310 315 320  
 5 Asp Lys Gly Leu Ile Pro Leu Gly Asp Val Pro Ala Pro Ala Ala Gly  
 325 330 335  
 Gly Lys Leu Gly Ala Leu Ala Ala Gly Glu Gly Gln Ala Ile Gly Ala  
 340 345 350  
 10 Glu Thr  
 <210> 20  
 15 <211> 330  
 <212> PRT  
 <213> *Oryza sativa*  
 <400> 20  
 20 Met Val Ile Ser Ser Lys Gly Lys Val Cys Val Thr Gly Ala Ser Gly  
 1 5 10 15  
 Phe Val Ala Ser Trp Leu Ile Lys Arg Leu Leu Glu Ala Gly Tyr His  
 20 25 30  
 25 Val Ile Gly Thr Val Arg Asp Pro Ser Asn Arg Glu Lys Val Ser His  
 35 40 45  
 Leu Trp Arg Leu Pro Ser Ala Lys Glu Arg Leu Gln Leu Val Arg Ala  
 50 55 60  
 Asp Leu Met Glu Glu Gly Ser Phe Asp Asp Ala Val Met Ala Cys Glu  
 65 70 75 80  
 35 Gly Val Phe His Thr Ala Ser Pro Val Leu Ala Lys Ser Asp Ser Asn  
 85 90 95  
 Cys Lys Glu Glu Met Leu Val Pro Ala Ile Asn Gly Thr Leu Asn Val  
 100 105 110  
 40 Leu Lys Ser Cys Lys Lys Asn Pro Phe Leu Lys Arg Val Val Leu Thr  
 115 120 125  
 Ser Ser Ser Ser Thr Val Arg Ile Met Asp Glu Ser Lys His Pro Glu  
 130 135 140  
 45 Ile Ser Leu Asp Glu Thr Ile Trp Ser Ser Val Ala Leu Cys Glu Lys  
 145 150 155 160  
 50 Leu Gln Leu Trp Tyr Ala Leu Ala Lys Ile Ser Ala Glu Lys Ala Ala  
 165 170 175  
 Trp Glu Phe Ala Lys Glu Asn Asn Ile Asp Leu Val Thr Val Leu Pro  
 180 185 190  
 55 Ser Phe Val Ile Gly Pro Ser Leu Ser His Glu Leu Ser Val Thr Ala  
 195 200 205  
 Ser Asp Ile Leu Gly Leu Leu Gln Gly Asp Thr Asp Arg Phe Ile Ser  
 210 215 220  
 60

Tyr Gly Arg Met Gly Tyr Val His Ile Asp Asp Val Ala Ser Cys His  
 225 230 235 240  
 5 Ile Leu Val Tyr Glu Ala Pro Gln Ala Thr Gly Arg Tyr Leu Cys Asn  
 245 250 255  
 Ser Val Val Leu Asp Asn Asn Glu Leu Val Ala Leu Leu Ala Lys Gln  
 260 265 270  
 10 Phe Pro Ile Phe Pro Ile Pro Arg Ser Leu Arg Asn Pro Tyr Glu Lys  
 275 280 285  
 Gln Ser Tyr Glu Leu Asn Thr Ser Lys Ile Gln Gln Leu Gly Phe Lys  
 290 295 300  
 15 Phe Lys Gly Val Gln Glu Met Phe Gly Asp Cys Val Glu Ser Leu Lys  
 305 310 315 320  
 20 Asp Gln Gly His Leu Leu Glu Cys Pro Leu  
 325 330  
 25 <210> 21  
 <211> 341  
 <212> PRT  
 <213> Fragaria x ananassa  
 30 <400> 21  
 Met Gly Leu Gly Ala Glu Ser Gly Ser Val Cys Val Thr Gly Ala Ser  
 1 5 10 15  
 35 Gly Phe Val Gly Ser Trp Leu Val Met Arg Leu Leu Glu His Gly Tyr  
 20 25 30  
 Thr Val Arg Ala Thr Val Arg Asp Pro Ala Asn Leu Lys Lys Val Arg  
 35 40 45  
 40 His Leu Leu Glu Leu Pro Gln Ala Ala Thr Arg Leu Thr Leu Trp Lys  
 50 55 60  
 Ala Asp Leu Asp Val Glu Gly Ser Phe Asp Glu Ala Ile Lys Gly Cys  
 65 70 75 80  
 45 Thr Gly Val Phe His Val Ala Thr Pro Met Asp Phe Glu Ser Glu Asp  
 85 90 95  
 Pro Glu Asn Glu Val Ile Lys Pro Thr Ile Asn Gly Met Leu Asp Ile  
 100 105 110  
 50 Met Lys Ala Cys Leu Lys Ala Lys Thr Val Arg Arg Leu Val Phe Thr  
 115 120 125  
 55 Ser Ser Ala Gly Ala Val Ala Ile Glu Glu His Pro Lys Glu Val Tyr  
 130 135 140  
 Ser Glu Asn Asn Trp Ser Asp Val Val Phe Cys Arg Lys Val Lys Met  
 145 150 155 160  
 60

Thr Gly Trp Met Tyr Phe Val Ser Lys Thr Leu Ala Glu Gln Ala Ala  
 165 170 175  
 5 Trp Lys Phe Ala Lys Glu Asn Asn Ile Asp Phe Ile Thr Ile Ile Pro  
 180 185 190  
 Thr Leu Val Ile Gly Pro Phe Leu Ala Pro Ser Met Pro Pro Ser Leu  
 195 200 205  
 10 Ile Ser Gly Leu Ser Pro Leu Thr Gly Asn Glu Ala His Tyr Gly Ile  
 210 215 220  
 Ile Lys Gln Cys Gln Tyr Val His Leu Asp Asp Leu Cys Gln Ser His  
 225 230 235 240  
 15 Ile Phe Leu Tyr Glu His Ala Lys Ala Glu Gly Arg Tyr Ile Cys Ser  
 245 250 255  
 20 Ser His Asp Ala Thr Ile His Asp Ile Ala Lys Leu Leu Asn Glu Lys  
 260 265 270  
 Tyr Pro Lys Tyr Asn Val Pro Lys Lys Phe Lys Gly Ile Glu Glu Asn  
 275 280 285  
 25 Leu Thr Asn Ile His Phe Ser Ser Lys Lys Leu Lys Glu Met Gly Phe  
 290 295 300  
 Glu Phe Lys His Ser Leu Glu Asp Met Phe Thr Gly Ala Val Asp Ala  
 305 310 315 320  
 30 Cys Arg Glu Lys Gly Leu Leu Pro Leu Pro Gln Glu Glu Glu Thr Glu  
 325 330 335  
 35 Lys Arg Arg Ala Gly  
 340  
 40 <210> 22  
 <211> 331  
 <212> PRT  
 <213> Zea mays  
 <400> 22  
 45 Met Val Thr Ser Ser Lys Gly Lys Val Cys Val Thr Gly Ala Ser Gly  
 1 5 10 15  
 Phe Val Ala Ser Trp Leu Ile Lys Arg Leu Leu Glu Ser Gly Tyr His  
 20 25 30  
 50 Val Val Gly Thr Val Arg Asp Pro Gly Asn His Gln Lys Thr Ala His  
 35 40 45  
 55 Leu Trp Lys Leu Pro Gly Ala Lys Glu Arg Leu Gln Ile Val Arg Ala  
 50 55 60  
 Asn Leu Leu Glu Glu Gly Ser Phe Asp Ser Ala Val Met Ala Cys Glu  
 65 70 75 80  
 60 Gly Val Phe His Thr Ala Ser Pro Val Leu Ala Lys Pro Asp Ser Thr

	85	90	95
	Ser Lys Glu Asp Thr Leu Val Pro Ala Val Asn Gly Thr Leu Asn Val		
	100	105	110
5	Leu Arg Ser Cys Lys Lys Asn Pro Phe Leu Lys Arg Val Val Leu Thr		
	115	120	125
	Ser Ser Ser Ser Ala Val Arg Ile Arg Asp Asp Gly Gly Gln Ser Ser		
10	130	135	140
	Asn Ile Ser Leu Asp Glu Thr Thr Trp Ser Ser Val Pro Leu Cys Glu		
	145	150	155
15	Lys Met His Leu Trp Tyr Ala Leu Ala Lys Val Phe Ala Glu Lys Ala		
	165	170	175
	Ala Trp Glu Phe Ala Lys Glu Asn Gly Ile Asp Leu Val Thr Val Leu		
20	180	185	190
	Pro Ser Phe Val Ile Gly Pro Ser Leu Ser His Glu Leu Cys Val Thr		
	195	200	205
	Ala Ser Asp Val Leu Gly Leu Phe Gln Gly Asp Thr Ala Arg Phe Ser		
25	210	215	220
	Ser Tyr Gly Arg Met Gly Tyr Val His Ile Asp Asp Val Ala Ser Ser		
	225	230	235
30	His Ile Leu Val Tyr Glu Val Pro Gln Ala Ala Gly Arg Tyr Leu Cys		
	245	250	255
	Ser Ser Val Val Leu Asp Asn Asp Glu Leu Val Ser Ser Leu Ala Lys		
35	260	265	270
	Arg Tyr Pro Ile Phe Pro Ile Pro Arg Arg Leu Asn Ser Pro Tyr Gly		
	275	280	285
	Lys Gln Ser Tyr Gln Leu Asn Thr Ser Lys Leu Gln Gly Leu Gly Phe		
40	290	295	300
	Lys Phe Arg Gly Val Gln Glu Met Phe Asp Asp Cys Val Gln Ser Leu		
	305	310	315
45	Lys Asp Gln Gly His Leu Leu Glu Cys Pro Leu		
	325	330	

**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

**BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

☐ **BLACK BORDERS**

☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**

☒ **FADED TEXT OR DRAWING**

☒ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**

☐ **SKEWED/SLANTED IMAGES**

☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**

☐ **GRAY SCALE DOCUMENTS**

☒ **LINES OR MARKS ON ORIGINAL DOCUMENT**

☒ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**

☐ **OTHER:** \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**